

CLAIM AMENDMENT

Listing of Claims

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A method for increasing the level of at least one 4'-*O*-methylated isoflavonoid compound in a target plant comprising transforming said target plant with a DNA fragment ~~comprising~~ of an isoflavone *O*-methyltransferase gene, said gene comprising SEQ ID NO:1 or a sequence exhibiting hybridization with SEQ ID NO:1 under conditions of 0.2 x SSC, 0.1 % SDS at 42°C, to form a transgenic plant and over-expressing said gene in said transgenic plant under the control of a suitable constitutive or inducible promoter.
2. (Original) The method of claim 1, wherein said compound is a 4'-*O*-methylated isoflavonoid phytoalexin.
3. (Original) The method of claim 1, wherein said compound is a 4'-*O*-methylated isoflavonoid nutraceutical.
- 4 - 5. (Canceled)
6. (Currently amended) A method of producing at least one 4'-*O*-methylated isoflavonoid compound in a target plant that does not produce said 4'-*O*-methylated isoflavonoid compound comprising transforming said target plant with a DNA fragment ~~comprising~~ of an isoflavone *O*-methyltransferase gene, said gene comprising SEQ ID NO:1 or a sequence exhibiting hybridization with SEQ ID NO:1 under conditions of 0.2 x SSC, 0.1 % SDS at 42°C, to form a transgenic plant and expressing said isoflavone *O*-methyltransferase gene in said transgenic plant under the control of a suitable constitutive or inducible promoter, said transgenic plant containing all the other necessary enzymes of isoflavonoid biosynthesis to produce said 4'-*O*-methylated isoflavonoid compound.

7. (Original) The method of claim 6, wherein said compound is a 4'-*O*-methylated isoflavonoid phytoalexin.
8. (Original) The method of claim 6, wherein said compound is a 4'-*O*-methylated isoflavonoid nutraceutical.
9. (Currently amended) The method of claim 6, ~~7-or-8~~, wherein the native DNA of said target plant encodes said enzymes.
10. (Currently amended) The method of claim 6, ~~7-or-8~~, wherein said target plant is genetically transferred to encode for at least one said enzyme.
- 11 - 14.(Canceled)
15. (Withdrawn) A method for producing at least one 4'-*O*-methylated isoflavonoid nutraceutical in non-plant cell system by expression of a DNA fragment comprising an isoflavone *O*-methyltransferase gene under the control of a suitable constitutive or inducible promoter in cells that have been genetically transformed to contain all the other necessary enzymes of isoflavonoid biosynthesis to make said 4'-*O*-methylated isoflavonoid nutraceutical.
16. (Withdrawn) The method of claim 15, wherein said fragment comprises SEQ ID NO:1.
17. (Withdrawn) The method of claim 15, wherein said fragment comprises a sequence exhibiting at least moderate hybridization with SEQ ID NO:1.
18. (Withdrawn) A method for decreasing the levels of formononetin, at least one of its conjugates or mixtures thereof in a transgenic forage legume comprising antisense expression, sense gene-mediated silencing, or nucleic acid-mediated insertional inactivation of a DNA fragment comprising an isoflavone *O*-methyltransferase gene under the control of a suitable constitutive or inducible promoter.

19. (Withdrawn) The method of claim 18, wherein said fragment comprises SEQ ID NO:1.
20. (Withdrawn) The method of claim 18, wherein said fragment comprises a sequence exhibiting at least moderate hybridization with SEQ ID NO:1.
21. (Withdrawn) The method of claim 18, 19 or 20, wherein said legume is alfalfa.
22. (Withdrawn) A method for decreasing the level of at least one 4'-*O*-methylated isoflavonoid compound in a target plant having all the necessary enzymes for synthesizing said 4'-*O*-methylated isoflavonoid compound comprising transforming said target plant with a DNA fragment comprising an isoflavone *O*-methyltransferase gene to form a transgenic plant and inducing antisense expression, sense gene-mediated silencing, or nucleic acid-mediated insertional inactivation of said isoflavone *O*-methyltransferase gene under the control of a suitable constitutive or inducible promoter.
23. (Withdrawn) The method of claim 22, wherein said compound is selected from the group consisting of a 4'-*O*-methylated isoflavonoid phytoalexin, a 4'-*O*-methylated isoflavonoid phytoalexin conjugate and mixtures thereof.
24. (Withdrawn) The method of claim 22 or 23, wherein said fragment comprises SEQ ID NO:1.
25. (Withdrawn) The method of claim 22 or 23, wherein said fragment comprises a sequence exhibiting at least moderate hybridization with SEQ ID NO:1.
26. (Withdrawn) A method for decreasing the level of at least one 4'-*O*-methylated isoflavonoid nutraceutical, at least 4'-*O*-methylated isoflavonoid nutraceutical or mixtures thereof in a target plant having all the necessary enzymes for synthesizing said 4'-*O*-methylated isoflavonoid nutraceutical or said conjugate comprising transforming said target plant with a DNA fragment comprising an isoflavone *O*-methyltransferase gene to form a transgenic plant and inducing

antisense expression or sense gene-mediated silencing of said isoflavone *O*-methyltransferase gene under the control of a suitable constitutive or inducible promoter, thereby increasing the level of the corresponding non-methylated precursor, its conjugate or mixture thereof.

27. (Withdrawn) The method of claim 26, wherein said fragment comprises SEQ ID NO:1.
28. (Withdrawn) The method of claim 26, wherein said fragment comprises a sequence exhibiting at least moderate hybridization with SEQ ID NO:1.
29. (Withdrawn) A method for the production of a 7-*O*-methylated isoflavonoid compound comprising contacting intact plants or cell suspension cultures with a non-methylated isoflavone precursor of said 7-*O*-methylated isoflavonoid compound, said intact plants or cell suspension cultures transformed with a DNA fragment comprising an isoflavone *O*-methyltransferase gene under the control of a suitable constitutive or inducible promoter.
30. (Withdrawn) The method claim 29, wherein said fragment comprises SEQ ID NO:1.
31. (Withdrawn) The method of claim 29, wherein said fragment comprises a sequence exhibiting at least moderate hybridization with SEQ ID NO:1.
32. (Withdrawn) A method for the production of a 7-*O*-methylated isoflavonoid compounds comprising contacting a soluble or immobilized isoflavone *O*-methyltransferase enzyme with a non-methylated isoflavone precursor to said 7-*O*-methylated isoflavonoid compound, wherein said enzyme is produced by the expression of a DNA fragment encoding the isoflavone *O*-methyltransferase gene in transgenic plants, transfected yeast, or transfected insect cells.
33. (Withdrawn) The method of claim 32, wherein said fragment comprises SEQ ID NO:1.

34. (Withdrawn) The method of claim 32, wherein said fragment comprises a sequence exhibiting at least moderate hybridization with SEQ ID NO:1.
35. (Withdrawn) A method to detect 4'-*O*-methyltransferase comprising the steps of
- a) preparing tissue that may have 4'-*O*-methyltransferase;
 - b) incubating said tissue with a first antibody that binds 4'-*O*-methyltransferase;
 - c) removing said antibody that did not bind to said tissue; and
 - d) incubating said tissue with a second antibody that binds said first antibody, said second antibody being detectably labeled.
36. (Currently amended) A method of increasing disease resistance in a target plant bycomprising transforming said target plant with a DNA fragment comprising of an isoflavone *O*-methyltransferase gene, said gene comprising SEQ ID NO:1 or a sequence exhibiting hybridization with SEQ ID NO:1 under conditions of 0.2 x SSC, 0.1 % SDS at 42°C, wherein said transformed plant exhibits increased levels of at least one 4'-*O*-methylated isoflavonoid when compared to levels of said 4'-*O*-methylated isoflavonoid in plants of the same species which do not comprise said DNA fragment.
- 37 – 38.(Canceled)
39. (Withdrawn) In a composition comprising at least one 4'-*O*-methylated isoflavonoid suitable for administration as a foodstuff, a nutritional supplement, an animal feed supplement, a nutraceutical, or a pharmaceutical, the improvement comprising 4'-*O*-methylated isoflavonoid isolated from at least a portion of a transgenic plant transformed with a DNA fragment comprising an isoflavone *O*-methyltransferase gene, wherein said transgenic plant exhibits increased levels of said 4'-*O*-methylated isoflavonoid when compared to levels of said 4'-*O*-methylated isoflavonoid in plants of the same species which do not comprise said

DNA fragment.

40. (Withdrawn) The composition of claim 39, wherein said fragment comprises SEQ ID NO:1.
41. (Withdrawn) The composition of claim 39, wherein said fragment comprises a sequence exhibiting at least moderate hybridization with SEQ ID NO:1.
42. (Withdrawn) The composition of claim 39, 40 or 41, wherein said transgenic plant is a legume.
43. (Original) A transgenic plant comprising at least one recombinant DNA sequence encoding ~~a portion of~~ an isoflavone *O*-methyltransferase gene, said gene comprising SEQ ID NO:1 or a sequence exhibiting hybridization with SEQ ID NO:1 under conditions of 0.2 x SSC, 0.1 % SDS at 42°C, wherein said transgenic plant upon expression of said gene exhibits increased levels of said 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.
44. (Currently amended) Seed from a transgenic plant comprising at least one recombinant DNA sequence encoding ~~a portion of~~ an isoflavone *O*-methyltransferase gene, said gene comprising SEQ ID NO:1 or a sequence exhibiting hybridization with SEQ ID NO:1 under conditions of 0.2 x SSC, 0.1 % SDS at 42°C, wherein said seed comprises the recombinant DNA and wherein said plant upon expression of said gene exhibits increased levels of 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.
45. (Currently amended) Progeny from a transgenic plant comprising at least one recombinant DNA sequence encoding ~~a portion of~~ an isoflavone *O*-

methyltransferase gene, said gene comprising SEQ ID NO:1 or a sequence exhibiting hybridization with SEQ ID NO:1 under conditions of 0.2 x SSC, 0.1 % SDS at 42°C, wherein said progeny comprises the recombinant DNA, and wherein said plant upon expression of said gene exhibits increased levels of 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.

46. (Currently amended) Progeny from seed of a transgenic plant comprising at least one recombinant DNA sequence encoding ~~a portion of an isoflavone *O*-methyltransferase gene,~~ said gene comprising SEQ ID NO:1 or a sequence exhibiting hybridization with SEQ ID NO:1 under conditions of 0.2 x SSC, 0.1 % SDS at 42°C, wherein said progeny comprises the recombinant DNA, and wherein said plant upon expression of said gene exhibits increased levels of 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.
47. (Withdrawn) A transgenic plant comprising at least one recombinant DNA sequence encoding a portion of an isoflavone *O*-methyltransferase gene, wherein said plant upon expression of said gene exhibits decreased levels of 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.
48. (Withdrawn) Seed from a transgenic plant comprising at least one recombinant DNA sequence encoding a portion of an isoflavone *O*-methyltransferase gene, wherein said plant upon expression of said gene exhibits decreased levels of 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.

49. (Withdrawn) Progeny from a transgenic plant comprising at least one recombinant DNA sequence encoding a portion of an isoflavone *O*-methyltransferase gene, wherein said plant upon expression of said gene exhibits decreased levels of 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.
50. (Withdrawn) Progeny from seed of a transgenic plant comprising at least one recombinant DNA sequence encoding a portion of an isoflavone *O*-methyltransferase gene, wherein said plant upon expression of said gene exhibits decreased levels of 4'-*O*-methylated isoflavonoid compounds when compared to levels of said 4'-*O*-methylated isoflavonoid compounds in plants of the same species which do not comprise said recombinant DNA sequence.